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Bulletin of INDIAN RAW MATERIALS & THEIR UTILIZATION

SERIES B
(Current Literature on Raw Materials other than Medicinal & Aromatic Plants)

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RURAL DEVELOPMENT SERIES. II. AGROCHEMICALS*

Mrs. S.P. Mehta

In a major agricultural country like India where about 80 per cent of the population lives in villages depending on the agricultural income, it is rather strange to note that important chemical industries are mostly confined to giant complexes in and around the urban cities, leaving the vast rural areas deprived of the resources obtained from these industries for development. In view of the world oil and resource crisis there is an urgent need for an agro-oriented, rural based industry, which has assumed greater importance in recent times than ever before.

The Department of Science and Technology realising this serious lacuna in planning has formulated a number of projects for application of science and technology for rural progress. To disseminate technical information from research laboratories to concerned industries a Technical information and Industrial Liaison Centre has been set up in Bombay for chemical and allied industries, with financial participation of the Indian Chemical Manufacturers' Association. To bridge the gaps in transfer and application of technology a number of polytechnology clinics are being set up by the CSIR in different States.

Several agencies such as the Small Industries Development Organisation (SIDO), Small Scale Industries Organisation (SSIO), Council for Application and Extension of Technology to Rural India (CAETRI), Khadi & Village Industries Commission (KVIC), Rural Artisan Programme, etc. also assist in coordinating, integrating and implementing these projects.

Punjab Markfed has emerged as the largest cooperative organisation in the country being the biggest promoter for establishing the major agro-based industrial complexes in Punjab. In Maharashtra, the Maharashtra Agro-Industrial Development Corporation (MAIDC) has helped to promote and set up agro-based industries in the rural areas. Launched by the Mysore University, Bharani is a unique experiment in integrated rural development, organised by an educational institution, to participate in rural progress.

This article discusses briefly agrochemicals under (a) agricultural

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* The term 'Agrochemicals' denotes chemicals which are derived from agricultural resources (in analogy to 'Petrochemicals') vis-a-vis 'Agrichemicals' which refer to chemicals used as input in agricultural operations.

inputs, viz. fertilizers and pesticides, and (b) chemicals from agricultural wastes and byproducts.

(a) Agricultural inputs

(i) Fertilizers - One of the major inputs for realizing the target of agricultural production is fertilizers. India produces nitrogenous, phosphate and NPK fertilizers on a large scale and there are about 21 nitrogenous and complex fertilizer plants, 30 super-phosphate plants, one phosphate plant, one triple super-phosphate plant and six steel plants producing byproduct ammonium sulphate. These projects involve lot of foreign exchange in the form of raw materials and machinery. As such the rural industry urgently needs agro-based fertilizer plants localised near the sites of raw material production. A number of products useful as manure compost, soil conditioners, etc. could be obtained from various agro-wastes (Table II) which otherwise add to atmospheric pollution.

(ii) Pesticides - Biocidal agricultural chemicals are collectively known as pesticides. They include insecticides, acaricides, fungicides and molluscides. Chemical pesticides remain the most powerful tools for control of many of world's important pests of agriculture and public health.

Since 1959 the pesticide industry has made tremendous progress. CSIR has developed know-how for 22 items identified by the National Committee on Science & Technology (NCST) of which 9 have been released for commercial exploitation e.g. 'Durofume', 'Minifume' for pest-proofing foodgrains, and processes for disinfecting water (Table I).

(b) Chemicals from agricultural byproducts and wastes

Stupendous source of chemicals is the waste products of agricultural operations. An idea of the estimated production of some of the important wastes is given in Table II. The NCST has set up a special panel to study the utilization of agricultural and animal wastes. Various laboratories under the aegis of CSIR have worked out know-how for a number of integrated technologies for rural industrialisation (Table I). There are examples of untapped agricultural raw materials that could be commercially exploited through improved and appropriate technologies, e.g. besides alcohol sugar molasses could also yield lactic, citric, acetic and gluconic acids. Similarly glycerine could be produced as a byproduct of the vegetable oil industry; furfural from coconut shell, coffee husk and bagasse; integrated cotton technology could be set up for producing surgical cotton, citric acid

and cattle feed, besides the oil and fibre. Table II enumerates some of the products which could be produced from agro-wastes.

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2. Chem.Times, (Special Suppl. on Agrochemicals), Sept. 13, 1976
3. Srivastava, J.C. Invent.Intell., 1977, 12(1&2), 45-54
4. Jain, H.C. & Aulakh, G.S. Bull.Indian Raw Mat. & Util., 1976, 2(2), i-xi
5. NRDC Processes, June 1976 (National Research Development Corporation of India, New Delhi)
6. CSIR Technologies in the Field of Agro-based Industries (Technology Utilization, CSIR, New Delhi), 1976

TABLE I

Technologies in the field of Agro-chemicals

Process/Product	Raw material	Laboratory	Status of technology
Wheat bran based technologies			
(a) Amylase, amyloglucosidase, glucosidase and pectinolytic enzyme	Wheat Bran	CFTRI	Commercial scale
(b) Fungal acid protease	Wheat bran	IIEM	Laboratory scale
(c) Enzyme bates	Wheat bran	CLRI	In production
Paddy based technologies			
(a) Activated carbon	Paddy husk	RRL, Hyd	Pilot plant scale (R)
(b) Carbon high pure and silica	Paddy husk	RRL, Bh	Being worked out
(c) Detergent for floor and dish washing	Paddy husk	RRL, Jt	Laboratory scale
(d) Silica flour	Paddy husk	RRL, Jt	Pilot plant scale
(e) Furfural	Paddy husk	RRL, Jt	In production
(f) Vegetable oil	Rice bran	CFTRI; OTRI	-
(g) Tecopherol concentrate	Rice bran	CDRI	Bench scale
Tapioca based technologies			
(a) Dialdehyde starch	Tapioca starch	CECRI	Bench scale (R)

(b) Enzyme bates	Tapioca flour	CLRI	In production
(c) Gum arabic substitute	Tapioca starch	NCL	In production
(d) Paint removing jelly	Tapioca starch	CECRI	Pilot plant scale (R)
(e) Phosphating jelly	Tapioca starch	CECRI	Laboratory scale
(f) Rust removing jelly	Tapioca starch	CECRI	Laboratory scale In production
Tamarind based technologies			
(a) Pectin and tartarate	Tamarind fruit pulp	CFTRI	Developed
(b) TKP - phosphate & borate	Tamarind kernel powder	NCL	Bench scale (R)
(c) Tartaric acid	Tamarind leaves	RRL, Jt	Bench scale
(d) Tannin extract	Tamarind seed kernel	CLRI	Pilot plant scale
(e) Extender in adhesive for plywood	Tamarind seed	IPIRI	Released free (R)
Cotton based technologies			
(a) Chemical cotton	cotton linters	RRL, Hyd	(R) In production
(b) Fatty acid	Seed soap-stock	RRL, Hyd	Freely demonstrated to industry
(c) Oil refining	Seed oil	RRL, Hyd	-do-
Castor based technologies			
(a) Castor oil dehydrated	Castor oil	RRL, Hyd	Pilot plant in production
hydrogenated		RRL, Hyd	In production
refining of		RRL, Hyd	Published and released

(b) Plasticizers for PVC resins	Castor oil derivative	SRI	Developed
(c) Urethane varnish	Castor oil	CLRI	Developed
Cashewnut based technologies			
(a) Cardanol and derivatives	Cashew nut shell liquid (CNSL)	RRL, Hyd	In production
(b) Expansion joint filler gum, rosin	CNSL	NCL; CBRI; RDSO	Developed
(c) Paint, Anti-corrosive	CNSL, dehydrated castor oil	RRL, Hyd	Pilot scale (R)
(d) Phosphated products of CNSL/ CNSL resins, BNSL/BNSL resins	CNSL, BNSL	RDSO	Developed
(e) Resin, Cation exchange	CNSL	NCL	In production till March 1973
(f) Resin emulsion	CNSL	RDSO	Developed
(g) Resin, Epoxy	CNSL	RDSO	Developed
(h) Resins for foundry moulds and cores	CNSL	RDSO	Developed
(i) Sealants for joints and cracks in building	CNSL	CBRI	Laboratory scale
(j) Tannin extracts	Cashew apple Cashew tests Cashew husk	CLRI ITRL	Developed
Molasses based technologies			
(a) Lactic acid	Molasses	NSI	-
(b) Oxalic acid	Molasses	RRL, Jt; NSI	Pilot plant scale (R)

(c) Sodium glutamate	Molasses	CFTRI	-
(d) Yeast - Baker's active dry	Molasses	CFTRI; RRL, Jt	In production
wet compressed	Molasses	CFTRI	Developed
Papaya based technologies			
(a) Papain (Crude)	Papaya	CFTRI	In production
(b) Papain (Crystalline and concentrate)	Raw papain from papaya	RRL, Hyd	In production
(c) Pectin	Papaya	CFTRI	In production
Tobacco based technologies			
(a) Cellulose	Tobacco stalks	FRI	-
(b) Nicotine sulphate	Tobacco waste	NCL	In production
(c) Oxalic acid	Tobacco leaf scrap	RRL, Bh	-
OTHER TECHNOLOGIES			
Mahua flowers			
(a) Alcohol	Flowers	RRL, Bh	Pilot plant scale
(b) Oxalic acid	Flowers	RRL, Bh	Pilot plant scale
Maize			
(a) Dialdehyde starch	Maize	CECRI	Bench scale (R)
(b) Furfural	Corn cobs	RRL, Jt	Laboratory scale
Sea-weeds			
(a) Agar agar	*Gelidiella gla-cilaria*	CSMCRI	Bench scale In production

(b) Agar oil - improved condensing unit		RRL, Jt	Developed
(c) Sodium alginate/alginic acid	Sargassum	CSMCRI	Bench scale (R)
Myrobalan			
(a) Syntan PKR	Flowers	CLRI	Developed
(b) Tannin extracts	Flowers	CLRI; ITRL	Developed
Sawdust			
(a) Carbon, high pure	Sawdust	RRL, Bh	Being worked out
(b) Oxalic acid	Sawdust	RRL, Jt	Pilot plant scale (R)
Oleoresins	Spices (pepper, ginger, chillies, turmeric	CFTRI	Developed
Aromatic and other essential oils			
(a) Aromatic principle of ambrette	Ambrette seeds (Musk seeds, Hibiscus abelmoschus)	NBG	Developed
(b) Atar and perfumed oils from flowers	Jasmine & allied flowers, sesame seed oil, sandal-wood oil	NBG	Developed
(c) Beta ionone	Lemongrass oil	NCL	Laboratory scale
(d) Cedarwood oil	Cedrus deodara	RRL, Jm	Pilot plant scale
(e) Cinnamon leaf oil	Cinnamon leaves	RRL, Jt	Pilot plant scale (R)
(f) Citral	Jammu lemongrass	RRL, Jm	Laboratory scale

..) Citronella oil	Citronella grass (Java citronella)	CIMPO/ RRL, Jt; RRL, Bh	In production
h) Citronellol	Eucalyptus citriodora	RRL, Jm	Semi large scale
(i) Costus root oil (byproduct fructose and chemazulene)	Dried costus root	NCL	Developed
(j) Eucalyptus oil	Eucalyptus citriodora	RRL, Bh	Field trials on cultivation
(k) Geranium oil	Geranium	CIMPO	Field trials on cultivation
(l) Geraniol	Cymbopogon spp. (RRL-14)	RRL, Jm	Laboratory scale
(m) Geraniol, citronellol and citronellal	Indian lemon grass	NCL	In production
(n) Lemongrass oil	Cymbopogon flexuosus	CIMPO	Field trials on cultivation
(o) l-menthol	Citronella oil	NCL	Laboratory scale
(p) Menthol	Dementholised mint oil	RRL, Jm	In production
(q) Mint oil	Mentha arvensis	CIMPO; RRL, Jt	Field trials on cultivation
(r) Palmarosa oil	Palmarosa grass	RRL, Bh; RRL, Hyd; RRL, Jt	-do- (R) Processing
(s) Peppermint oil	Mentha piperita	CIMPO	Field trials on cultivation
(t) Pine oil and terpineol	Turpentine oil	RRL, Jm	Pilot plant scale
(u) Rose oil	Rose flowers	NBG	Laboratory scale

(v) Sandal wood oil (solvent extraction)	Sandalwood powder	NCL	Pilot plant scale
Bromelain	Pineapple waste	RRL, Jt	Laboratory scale
Caffeine	Tea waste	RRL, Jt	In production
Carbon, Activated	Coconut shell	CFRI RRL, Hyd	Pilot plant scale Pilot plant scale (R)
Carboxymethyl cellulose	Jute loom caddis	IJIRI	Being worked out
Extender in adhesives for plywood	Sal meal/ground-nut cake/soya meal	IPIRI	(R)
Furfural	Corn cobs/bagasse/ rice husk	RRL,Jt	Laboratory scale
Linseeds oil emulsion	Linseed oil	NCL	Batch scale
Pectin			
(a) Pectin	Papaya and other pectin rich fruits	CFTRI	In production
(b) Pectin, distilled lime oil and calcium citrate	Lime fruit	CFTRI	In production
Protein			
(a) Protein hydrolysate	Groundnut cake	CDRI	Batch scale
(b) Protein isolate	Groudnut & soyabeans	CFTRI	In production
Sulphited fat liquors	Sardine fish oil and shark liver oil	CLRI	Developed

ax			
a) Wax, Sisal	Sisal waste	NCL	In production
b) Wax, Sugarcane	Press mud/filtration cake from sugar mills	RRL, Jt; NCL; NSI	Laboratory scale
st proofing technologies			
a) 'Durofume' process	-	CFTRI	Developed
b) 'Minifume' fumigating tablet	-	CFTRI	Developed
c) Chlorine ampoules and tablets (disinfecting water)	Bleaching powder, sodium carbonate, boric acid	NEERI	Developed
d) Pest, proofing of gunny bags	-	CFTRI	Developed

ABBREVIATIONS USED

CBRI - Central Building Research Institute, Roorkee
CDRI - Central Drug Research Institute, Lucknow
CECRI - Central Electrochemical Research Institute, Karaikudi
CFRI - Central Fuel Research Institute, Jealgora
CFTRI - Central Food Technological Research Institute, Mysore
CIMPO - Central Indian Medicinal Plants Organisation, Lucknow
CLRI - Central Leather Research Institute, Madras
CSMCRI - Central Salt & Marine Chemicals Research Institute, Bhavnagar
FRI - Forest Research Institute, Dehra Dun
IIEM - Indian Institute of Experimental Medicine, Calcutta
IJIRA - Indian Jute Industries Research Association, Calcutta

IPIRI - Indian Plywood Industries Research Institute, Bangaloro
ITRL - Industrial Testing Research Laboratory, Trivandrum
NBG - National Botanic Gardens, Lucknow
NCL - National Chemical Laboratory, Poona
NEERI - National Environmental Engineering Research Institute, Nagpur
NSI - National Sugar Institute, Kanpur
OTRI - Oil Technological Research Institute, Anantapur
RDSO - Research Design and Standards Organization, Chittaranjan, Lucknow
RRL,Bh Regional Research Laboratory, Bhubaneswar
RRL,Hyd Regional Research Laboratory, Hyderabad
RRL,Jm Regional Research Laboratory, Jammu-Tawi
RRL,Jt Regional Research Laboratory, Jorhat
SRI - Sri Ram Institute for Industrial Research, Delhi
(R) - Released to industry

TABLE II

Potential products of Agro-wastes

Product	Raw Material	Availability
Acids, acetic, citric, gluconic and lactic	Sugar molasses	1.7 m. tonnes
Alcohol and other chemicals	Jute sticks	2.5 m. tonnes
Alcoholic beverages	Potato peels	-
Caffeine	Coffee husk	44.450 tonnes
Carbon, Active	Groundnut hulls;	-
	Apple peels & pomace;	
	Arecanut husk	0.1 m. tonnes
Cellulose	Cotton linters	-
Citric acid	Cotton leaves	-
Furfural	Coconut coir dust	0.16 m. tonnes
	Coconut shell	0.88 m. tonnes
	Coffee husk	44.450 tonnes
	Bagasse	5.26 m. tonnes
Fertilizer (Good NPK) Manure & Compost, and	Cotton dust	30,000 tonnes
	Coffee husk;	44,450 tonnes
	Tobacco seeds;	10,000 tonnes
	Pea shells & vines	-
Soil conditioner	Rice husk	15 m. tonnes
Glycerine (as byproduct)	Vegetable oil industry	-
Oil, Edible	Coffee husk	44,450 tonnes

Oil vegetable (edible & industrial)	Tobacco seeds	10,000 tonnes
	Grape seeds	-
	Mango kernels	8,500 tonnes
	Peach stones	-
	Plum stones	-
	Tomato seeds	800 tonnes
Oil, Essential	Citrus peels	3,000 tonnes
Pectin	Apple peels & pomace	400 tonnes
	Citrus peels	3,000 tonnes
Protein (cattle feed)	Rice bran	15 m. tonnes
Rayon fibre	Rubber wood	0.25 m. tonnes
Starch	Mango kernels	8,500 tonnes
	Potato peels	-
Sugar	Pineapple peels etc.	2,100 tonnes
	Cotton stalks	-
Vinegar	Apple peels & pomace	400 tonnes
	Pineapple peels etc.	2,100 tonnes
Wax	Banana peels	-

RAW MATERIALS
(including chemical constituents)

ANIMAL & ANIMAL PRODUCTS

Livestock

109. Chaudhuri, A.C. (Secretary General, Indian Woollen Mills' Association): Indian woollen industry & export markets. J.Ind. & Tr.,Delhi, 1976, 26(10), 15-21,32

110. Ganesan, M., Venkateswara Rao & Mahadevan, T.S.K. (Cent.Leath.Res. Inst., Madras-20): Rapid E.I. Tanning of buff calf skins. Leath. Sci., 1976, 23(10), 357-59

A rapid process has been developed for tanning buff calf skins.

111. Helali, E., El-sheikh, A. & Safwat, M. (Fac.Agric., Al-Azhar Univ., Cairo, Egypt): Effect of seasonal variations on the quantity and quality of buffalo milk-fat. Indian J.Anim.Sci., 1976, 46(10), 525-28

Statistical information about different fatty acids in buffalo milk-fat of individual animals in their first and fourth lactations during different months of the year are given in the above article.

112. Saikia, S. & Sharma, P.K. (Assam Agric.Univ., Khanapara): Studies on some economic traits of cross-bred cattle underintensive cattle development project, Gauhati, Assam. Indian vet.J., 1977, 54(2), 119-22

Studies regarding ages at maturity and at first calving in the cross-bred Jersey F_1 and F_2 heifers born of A.I. programme of the Intensive Cattle Development Project, Gauhati were carried out.

Poultry

113. Dubey, R.A., Johari, D.C., Singh, R.P. & Singh, B.P. (U.P.Coll.Vet. Sci., Mathura): A study of artificial insemination in relation to

fertility and hatchability in White Leghorn birds. Indian vet. J., 1977, 54(2), 116-18

Studies on artificial insemination in 72 pullets of one strain of White Leghorn breed using 24 breeding cocks revealed that it improved the fertility and hatchability of eggs.

Others

114. Becker, G. (Hony Prof. of Technical Univ., Berlin, Federal Republic of Germany): Concerning termites and wood. Unasylva, 1976, 28(III), 2-11

The article covers the biology, ecology of termites, control measures and wood preservation against them.

115. Grones, C.P. (Dep.Prehistory & Anthropology, SGS Aust.Nat.Univ., Canberra, A.C.T. 2600): Taxonomy of Moschus (Mammalia, Artiodactyla), with particular reference to the Indian region. J.Bombay nat.Hist. Soc., 1975, 72(3), 662-76

Distribution and taxonomical status of the musk deer of Asia are discussed.

116. Sankaran, T. (Commonw.Inst.Biol.Control, Bangalore): Natural enemies introduced in recent years for biological control of agricultural pests in India - (review article). Indian J.agric. Sci., 1974, 44(7), 425-33

Reviews major pests of agricultural crops and their control measures through introduction of exotic natural enemies.

117. Subrahmanyam, M. (Dep.Zool., Andhra Univ., Waltair, Andhra Pradesh): Notes on some aspects of the biology of Palaemon styliferus Milne-Edwards from the Godavari estuarine system. J.Bombay nat.Hist.Soc., 1975, 72(3), 683-91

Biology and economics of breeding this prawn of commercial value in the estuarine and brackish waters of India are discussed.

118. Wisely, B. Developments in Oyster culture. Aust.Fish., 1976, 35(12), 6-7

Japanese and Australian methods for fast growing oyster discussed.

MARINE PRODUCTS

119. Nayar T.P.K. (Marine Product Export Development Authority, Cochin): Indian seafoods and export trade. J.Ind. & Tr.,Delhi, 1976, 26(9), 10-16

PLANTS & PLANT PRODUCTS

Beverages

120. Coffee. Trop.Prod.Quart., 1976, 17(2), 241-69

Forecast of world production of coffee in 1976-77 is estimated between 58 and 61 million bags. Figures of production of coffee in India from 1968-69 to 1975-76 are also given.

121. Cocoa. Trop.Prod.Quart., 1976, 17(2), 220-40

World production of cocoa from the year 1969-70 to 1975-76 has been given.

122. Balu, V. (Coffee Board, Bangalore): Marketing of coffee. J.Ind. & Tr.,Delhi, 1976, 26(9), 25-28

Problems relating to marketing of coffee discussed.

123. Bose, B. (Tea Board, Calcutta): India tea industry enters a new phase. J.Ind. & Tr., Delhi, 1976, 26(9), 34-35

Growth of tea industry is traced.

124. Rourk, J.P. Uptrend in coffee output unlikely in six countries in Asia and Africa. Foreign Agric., 1976, 14(44), 2-4

Production of coffee in six countries - Indonesia, India, Kenya, Zaire, Cameroon, and Ivory Coast, is unlikely to expand significantly in the next 3-5 years.

125. Tetro, R.C. India's tea crop, exports to set record. Foreign Agric., 1976, 14(45), 14

Total Indian tea production is estimated at about 500,000

tons, and exports at 210,000 to 220,000 tons. Earnings from exports during 1976 are expected to be substantially higher than 1975's £ 292 million because of higher unit values.

Carbohydrates (Sugars, Starches & Pectins)

126. Das Gupta, D.K. (Njala Univ.Coll., Univ.Sierra Leone, Sierra Leone): Effects of cycocel on crop plants in Sierra Leone. II. Cassava (Manihot esculenta). Exp.Agric., 1976, 12(4), 321-28

The foliar application of CCC on cycocel, a plant growth resulted in a greater tubular yield and dry matter content of tubers; the increase being most pronounced when plants were harvested 393 days after planting CCC at 1500 ppm, applied four times gave best yields.

127. Paul, Y., Saimbhi, M.S., Sharma, B.N. & Verma, K. (Dep.Chem. & Biochem., Punjab Agric.Univ., Ludhiana 141004): Influence of some herbicides on the chemical composition of potato tubers. Indian J.agric.Sci., 1974, 44(12), 800-03

Linuron increased the fat content while nitrofen decreased the dry weight and starch. Propanil lowered the non-reducing sugars whereas paraquat increased the starch content.

128. Shanthamallaiah, N.R., Kulkarni, G.N. & Patil, S.V. (Univ.Agric. Sci., Dharwar Campus, Karnataka): Water requirement of drilled 'IR 8' rice under different water-management practices in black soils (Vertisol) of Karnataka. Indian J.agric.Sci., 1974, 44(8), 537-40

IR 8 rice grain yield was more by 112% and 21% under submergence than under rainfed and saturation practices. The straw yield was more by 21% and 9% under submergence than under rainfed and saturation practices.

Dyes, Tans & Other Pigments

129. Greenhalgh, C.W. Aspects of anthraquinone dyestuff chemistry. Endeavour, 1976, 35(126), 134-40

Demand for anthraquinone dyestuffs necessitated extra colour value and efforts are made to find cheaper routes to the existing products, a pattern which is already apparent in the development of quinizarin chemistry.

130. Mishra, Nivedita (Smt.), Bhuyan, B., Patnaik, L.N. & Rout, M.K. (Dep.Chem.Ravenshaw Coll., Cuttack): Dyes derived from 2-(2-benzoxazolyl)- & 2-(2-benzothizolyl)-malondialdehydes. Indian J. Chem., 1976, 14B(10), 806-07

Syntheses of several dyes, viz. cyanines, oxonols and merocyanines derived from 2-(2-benzoxazolyl)- and 2-(2-benzothiasolyl)-malondialdehydes have been reported.

131. Sarkar, J.K. & Banerjee, P.K. (Cent.Lab., Corp. of Calcutta, Calcutta): Chromatographic examination of anthocyanins in Lathyrus sativus Linn. Curr.Sci., 1977, 46(2), 62

Methanolic extract of fresh and powdered kesari pulse have been studied for anthocyanins. The chromatogram shows the presence of cyanin (cyanidin 3 : 5 diglucoside) and pelargonin (pelargonidin 3 : 5 diglucoside).

132. Sriharan,S. & Garg, A.K. (Indian Agric.Res.Inst., New Delhi): Effectiveness of granular placement of carbofuran, phorate and sevidol on the absorption by rice plant and the control of green leaf-hopper. Indian J.agric.Sci., 1974, 44(8), 540-44

Sevidol is found to take more time for absorption than carbofuran and phorate in the control of green leaf-hopper of rice plant.

Fats, Vegetable Oils & Waxes

133. Vegetable oils and oilseeds. Trop.Prod.Quart., 1976, 17(2), 159-219

World production of the major vegetable oilseeds and olive, palm and tung oils is given. For India, statistics regarding area and production of oilseeds, groundnuts (unshelled), rape and mustard seeds, sesame seed, linseed and castor seed for the years 1973-74, 1974-75, and 1975-76 are included.

134. El Tinay, A.H., Khattab, A.H. & Khidir, M.O. (Fac.Agric., Univ. Khartoum, Sudan): Protein and oil compositions of sesame seed. J.Amer.Oil Chem.Soc., 1976, 53(10), 648-53

Development of sesame protein of improved quality is receiving lot of attention these days. Oil %, oil composition and iodine value and colour of introduced (including Indian) and Sudanese sesames are given.

Fibres & Pulps

135. Alexander, J. (Coir Board, Ernakulam, Kerala): Coir industry of India and export markets. J.Ind. & Tr.,Delhi, 1976, 26(10), 15-21,31

136. Dhyani, K.C. & Geo Paul, N. (Res.Stn, JARI (ICAR), Bambra, Orissa): Some observations on the yield and quality of sisal fibre. (1) Performance of bulbils and suckers as planting material. Jute Bull., 1974, 36(11&12), 225-26,28 (pub., 1977)

Field trials showed the yield and quality of sisal fibre when the plantation is raised by bulbils or suckers are not significantly different. Bulbil plantation is however recommended as it gives a more uniform growth.

137. Geo Paul, N., Dhyani, K.C. & Bhattacharyya, S.S. (Jute Technol.Res. Lab. (ICAR), Calcutta-40): Some observations on the yield and quality of sisal fibre. (II) Fibre properties at different ages of the plant. Jute Bull., 1974, 36(11&12), 227-28 (pub., 1977).

Results of trials conducted show that fibre quality improves with the age of the plant upto 54 months after which there is a fall in values of length and texure except for 66 months crop age. The fibre tenacity and structure of Indian and E.African sisal fibres compared.

Fruits & Nuts

138. Bana, D.S., Srivastava, R.P. & Hari Om (Hill Fruit Res.Stn, Chaubattia (Ranikhet), U.P.): Studies on the thinning of the fruits by hand and with plant growth substances and their effects on the final retention and quality of apple cv. red delicious. Indian J. Hort., 1976, 33(3&4), 227-32

Higher doses of NAA & 2,4,5-T (50 ppm) and hand thinning (50 %) were quite effective in the thinning of fruits. Alar treatments gave significant reduction of size of the fruits. The treatment with growth substances and 50 % hand thinning increased the T.S.S. and total sugar contents of the fruits. The ascorbic acid content was increased by 2,4,5-T & NAA 10 ppm, Alar 1500 ppm and Ethrel 500 ppm.

139. Chadha, K.L., Subramanian, T.R. & Mohanta, K.R. (Indian Inst.Hort. Res., Bangalore): Effect of varying levels of N.P and K on growth, yield and quality of pineapple in variety queen. Indian J.Hort., 1976, 33(3&4), 224-26

In respect of fruit weight with and without crown, significant responses were observed only to nitrogen but not to phosphorous and potassium. The same trend was noticed in the case of leaf number and total planting material except that P effects were also significant in total planting material. Practically no effect of application of N,P & K was seen in fruit T.S.S. and acidity.

140. Chohan, G.S. & Dhillon, B.S. (Dep.Hort., Punjab Agricultural University, Ludhiana): Effect of gibberellic acid, thiourea and stratification on the germination of grape seeds. Indian J.Hort., 1976, 33(3&4), 212-15

Firstly extracted seeds of Anab-e-Shahi, Early Muscat and Cardinal did not germinate at all even when treated with GA3 up to 750 ppm and thiourea 20,000 ppm. As the period of stratification increased, the seed germination also increased. Sixty days period of moist stratification was sufficient for maximum seed germination in all these cultivars. Gibberellic acid (250 & 500 ppm) and thiourea (10,000 ppm) were the most effective in improving the germination of grape seeds.

141. Ganapathy, K.M. & Singh, H.P. (Hort.Exp.Stn, Chethalli): Storage behaviour of purple passion fruit (Passiflora edulis Sims) under different storage conditions. Indian J.Hort., 1976, 33(3&4), 220-23

Passion fruit can be stored in unperforated polyethylene bags for 18 days without causing appreciable changes in their freshness and physico-chemical characters.

142. Khanduja, S.D., Balasubrahmanyam, V.R. & Agnihotri, U.P. (Nat.Bot. Gdn, Lucknow): Effect of boron on fruit quality, nucleic acid and protein content of leaves in grapevine. Indian J.Hort., 1976, 33(3&4), 216-19

Foliar application of boron to Thompson Seedless and Bhokri vines a week before bloom and again at full bloom promoted synthesis of protein and RNA in the leaves and increased sugar content of the berries. Acid content was not affected.

143. Misra, L.P. & Dhuria, H.S. (Reg.Fruit Res.Stn, Mashobra, H.P.): Effect of naphthalene acetic acid and planofix on the control of pre-harvest fruit drop in apple cv. Lord Lambourne. Indian J.Hort., 1976, 33(3/4), 233-36

NAA & Planofix each at 10 ppm (a.i.) checked fruit drop. Significant increase in weight, diameter and length of the fruit was also seen in the treatments containing NAA 10 ppm and Planofix 10 ppm over others. Storage life and fruit quality were not altered by these treatments.

144. Pandey, R.M. & Singh, R.N. (Dep.Hort., G.B.Pant Univ.Agric. & Tech., Pant Nagar, Nainital, U.P.): Chemical regulation of ripening in mango. Indian J.Hort., 1976, 33(3&4), 209-11

The response of mango CV Dashehari grown commercially in North India to Ethrel is not constant throughout the life cycle of the fruit and the age of the fruit at the time of harvest has a pronounced effect on ripening. Ethrel imparts attractive colour to the fruits and increases their commercial value but tends to reduce the ascorbic acid and total sugar contents.

145. Singh, G.R., Kapoor, I.J. & Raychaudhuri, S.P. (Div.Mycology & Plant Pathology, I.A.R.I., New Delhi): Occurrence of latent infection of Colletotrichum gloeosporioides in citrus twigs. Indian J.Hort.,197 33(3&4), 237-40

Latent infection is noticed in apparently healthy citrus twigs and is mostly confined to the bark region and certain amount of the pathogen penetrated in the wood as well. Surface sterlization with 0.1% mercuric chloride for 90 minutes had no effect on the infection.

Vegetables

146. Selvaraj, Y., Divakar, N.G. & Vijay, O.P. (Indian Inst.Hort.Res., Bangalore-560001): Note on the biochemical constituents of some improved varieties of brinjal. Indian J.Agric.Sci., 1974, 44(12), 905-06

Brinjal varieties having higher concentration of different biochemical constituents are listed.

Others

147. Chaudhary, D.N. & Singh, B.B. (G.B.Pant Univ.Agric & Technol., Pant Nagar, Nainital, U.P.): Correlation and path-coefficient analyses of yield components in soybean. Indian J.agric.Sci., 1974, 44(7), 487-90

High genotypic and phenotypic correlations were observed between yield, plant height, number of nodes on the main stem, number of pods and number of seeds/plant. The number of seeds/plant was highly correlated with the number of pods/plant.

148. Faroda, A.S. & Patil, B.D. (Cent.Sheep & Wool Res.Inst., Avikanagar-304501): A note on the micronutrient status in Cenchrus grass. Indian J.Anim.Sci., 1975, 45(5), 299-300

Effect of zinc, copper and cobalt in Cenchrus when fed to sheep is discussed.

149. Patil, V.N. & Kokle, Y.S. (Coll.Agric., Nagpur). Path-coefficient analysis in soybean. Indian J.agric.Sci., 1974, 44(8), 544-46

Path-coefficient analysis in soybean indicated that the weight of pods is the main yield-contributing character, whereas plant height, number of branches/plant and number of pods/plant increased the yield through pod weight.

150. Ramachandran Nair, A.G. & Sankara Subramaniam, S. (Dep.Chem., Jawaharlal Inst.Postgraduate Med.Edu & Res., Pondicherry): Rothindin - A new isoflavone glucoside from Rothia indica Linn. Indian J.Chem., 1976, 14B(10), 801-02

A new isoflavone glucoside, rothindin, has been isolated from the ethanolic extract of the plant. It has been characterized as 3',4'-methylene-dioxy-7-O-α-D-glucopyranosylisoflavone (pseudobaptigenin-7-O-β-D-glucopyranoside).

151. Sengupta, P., Sen Manju (Miss), Basak, Manjusree (Miss), Pakrashi, S.C. & Esahak Ali (Dep.Chem., Univ.Kalyani, Kalyani, West Bengal): Chemical constituents of Pteris wallichiana. Indian J.Chem., 1976, 14B(10), 817-18

β-Sitosteryl palmitate, β-sitosterol, pterosin-B (II) and pterosin-C (III) have been isolated from the benzene extracts of the rhizome of the plant.

152. Srivastava, D.N., Bhatt, S.K. & Udupa, K.N. (Surg.Res.Lab., Inst. Med.Sci., Banaras Hindu Univ., Varanasi, U.P.): Gas chromatographic identification of fatty acids, fatty alcohols, and hydrocarbons of Hibiscus rosa-sinensis leaves. J.Amer.Oil Chem.Soc., 1976, 53(10), 607-08

Chemical contents of the leaves of the plant are given.

153. Varshney, I.P. & Vyas, P. (Dep.Chem., G.S.Inst.Tech. & Sci., Indore): Samanin-A, a new saponin from the seeds of Pithecolobium saman Benth. Indian J.Chem., 1976, 14B(10), 814-15

From the seeds of the plant, sucrose and a new saponin, m.p. 192-94°, named as Samanin-A have been isolated.

UTILIZATION

AGRO-BASED INDUSTRIES

Field Crops

154. Krishnamurty, K., Rajashekara, B.G., Raghunatha, G., Jagannath, M.K., Ramachandra Prasad, T.V., Venugopal, N. & Bommegowda, A. (Agron. Dep., Univ.Agric.Sci., Bangalore): Impact of defoliation on yield and its components in Sorghums. Indian J.Agron., 1976, 21(1), 1-6

It was observed that about 66% of grain yield was obtained

from leaves alone. The yield reductions varied depending on the area of the lamina removed. Top leaves were relatively more important than the bottom ones. Defoliation caused at heading had higher reduction in yield (24%) than defoliation imposed at blooming (16%) as compared to no defoliation

155. Rai, S.D., Arora, K.N. & Verma, M.L. (G.B.Pant Univ.Agric. & Technol., Pant Nagar, Nainital): Effect of sowing dates, seed rate and cutting management on the forage yield and nutritive value of oats. Indian J.Agron., 1976, 21(7), 7-10

The effect of environmental factors on the forage yield and nutritive value of oats are recorded in the above article.

Industrial Crops

156. Bananas from India. J.Ind. & Tr.,Delhi, 1976, 26(9), 36-38

Gives the world situation and trading in bananas.

157. Balasubramaniam, D. (Cashew Export Promotion Council, Cochin): The Indian cashew industry. J.Ind. & Tr.,Delhi, 1976, 26(9), 17-20

Summarisesthe development programmes, export figures and the problems and prospects of the Indian Cashew Industry.

ANIMAL-BASED INDUSTRIES

Dairy

158. Singh, R.S. (Nat.Dairy Res.Inst., East Reg.Stn, Kalyani): A note on isolation of aflatoxigenic mould from dahi. Indian J.Anim.Sci., 1976, 46(12), 652-53

Study was conducted to determine the presence of aflatoxigenic moulds in fermented milk in hot and humid climates of eastern India.

Leather

159. Atal, S.L. (Bharat Leather Corporation Ltd.): The problems of resources and their fuller use : early action stressed. Leath.Sci., 1977, 37(8), 355-57

Problems faced by leather industry enumerated.

Sericulture

160. Sericulture in Maharashtra. Indian Silk, 1977, 15(10), 15-17

Growth and development of silk industry in the State reviewed.

161. Arora, G.S. & Rao, C.B.J. (Zool.Surv.India, Calcutta): A review of the taxonomic status of the hybrids with particular reference to Antheraea proylei (Lepidoptera : Saturniidae) - Scientific Note. Indian J.Seric., 1976, 15(1), 46-48

Reviews the systematic position of the different hybrids with particular reference to Antheraea proylei.

162. Gupta, B.K., Sengupta, K. & Sarker, A. (Cent.Seric.Res.Stn, Berhampore): Sericulture promises maximum employment per unit of land. Indian Silk, 1976, 15(3), 17-21

Discuss how sericulture has the maximum employment potential per unit of land in the country.

163. Mano, Yasuhisa (Silkworm Breed.Lab., Seric.Exp. tn (Ayabe), Min. Agric. & For., Japan): Silkworm breeding. Indian Silk. 1976, 15(8), 7-11

Modern methods of silkworm breeding with particular reference to the acclimatisation of bivoltine races introduced in India are given.

164. Mizuide, M. (Cocoon Properties Div., Seric.Exp.Stan Shanshi Shikenjo, Min.Agric. & For., Govt. of Japan): Scope for modernising silk reeling sector. Indian Silk, 15(8), 13-19

India can achieve the target of producing 500 metric tonnes

of international quality raw silk by gearing up the reeling sector which is required to be equipped with automatic machinery for this purpose.

165. Panthulu, N.K. & Reddy, V.J. - Development of sericulture in Rayalaseema. Khad Gramodyog, 1977, 23(6) 300-04

Silk industry and its vast potential in one area in Andhra Pradesh are discussed.

CHEMICAL & ALLIED INDUSTRIES

Agrochemicals

166. 2,2 Dichloropropionic acid (Dalapon). Chem.Petro-chem.J., 1976, 7(12), 37-38

National Chemical Laboratory, Pune has developed a new process involving chlorination of propionic acid, for the manufacture of dalapon, a selective weedicide for the control of grasses in tea gardens, sugar-cane, sugar beet, maize, potato and other similar crops. The process involves chlorinating propionic acid. The present requirement of the chemical is met with imports.

Chemicals

167. Caustic soda. Commerce, 1976, 133(3414), 9

Caustic soda is a basic heavy inorganic chemical consumed mainly by aluminium, rayon, viscose fibre, soap and paper & pulp industries. At present there are 31 units producing caustic potash and has a total capacity of 6,63,000 tonnes.

168. Chlorine tablets. Econ.Trends, 1977, 6(2), 50

National Environmental Engineering Research Institute (NEERI), Nagpur has developed a process for the manufacture of chlorine tablets for disinfecting drinking water. The raw materials required are common salt, sodium carbonate, bleaching and chalk powders.

169. Nitric acid. Commerce, 1976, 133(3414), 9

Nitric acid is a key put in the manufacture of basic organic chemicals, fertilisers, explosives and aromatics. The production of nitric acid has shown a steady increase from 3,72,800 tonnes in 1973 to 4,57,400 tonnes in 1975.

170. Hydrochloric acid. Commerce, 1976, 133(3414), 9

Hydrochloric acid is largely required in paper, textile, printing, aluminium and nickel polishing, oil-drilling, etc. Current estimated production of 1,50,000 tons is likely to go up to 2,20,000 tons by 1978-79

171. Sulphuric acid. Commerce, 1976, 133(3414), 9

To reduce the country's dependence on imported sulphur, production of sulphuric acid has been established from pyrites mined at Amjor (Bihar) and from sulphurous gases of non-ferrous metal plants like zinc smelters at Alwaye and Udaipur and Copper smelters at Ghotsila and Khetri.

172. Panicker, P.K. (Eskeyar Engng Co.Pvt.Ltd., Madras): Borax. Part I. History and technology of refining. Chem.Age India, 1976, 27(10), 897-900

Reviews the technology of refining the chemical.

Fats & Oils

173. Vegetable oils and waxes from Indian plants. Econ.Trends, 1977, 6(3), 45-46

CSIR National Laboratories have developed processes for obtaining vegetable oils and waxes from plant resources such as cottonseeds, castor seeds, sisal, gum ghatti, sugarcane press mud etc.

Fuels

RRL's substitute for furnace oil. Econ.Trends, 1977, 6(2), 47

Regional Research Laboratory, Bhubaneswar has developed a multi-fuel combustion system where the bituminous coals partly or wholly replace the furnace oil which is hitherto imported.

Petrochemicals

175. Improved kerosene stove. Indian east Engr, 1976, 118(12), 592

R & D Centre of Indian Oil Corporation has developed a non-pressure kerosene wick stove which is more efficient, safer and durable.

Others

Scooters India. Lok Udyog, 10(8), Suppl. 1-8

Illustrates the current status of this undertaking.

177. Patel, M.M. (Synthetics & Chemicals Ltd., Bareilly, U.P.) Nitrile rubber : product of Indian know-how. Commerce, 1976, 133(3414), 44

Nitrile rubber is required to impart oil - resistance to rubber products. It is required in the making of oil-seals, gaskets, O-rings, beltings, industrial footwears, military defence shoes etc. Synthetics & Chemicals Ltd. has establishe the production of nitrile rubber at Bareilly, U.P. based on the technology, developed at National Chemical Laboratory, Pune.

ENGINEERING INDUSTRIES

Energy

178. Ramanna, R. (Bhaba Atomic Res.Cent., Bombay): Technology and economics of MHD power generation. Indian east Engr, 1976, 118(12), 571-73, 603

The importance of MHD power generation and its economic aspects with reference to India are discussed.

Instruments & Instrumentations

179. Alkaloid separator. Econ.Trends, 1977, 6(2), 48

Regional Research Laboratory, Bhubaneswar has developed an improved process for the extraction and separation of strychnine and brucine, the alkaloids from plant materials. (NRDC Process available).

180. Steam distillation plant for essential oils. Chem.Petro-chem.J., 1976, 7(12), 38

Regional Research Laboratory, Bhubaneswar has developed a steam distillation unit for distilling essential oils from plant materials.

FOOD & BEVERAGE INDUSTRIES

Feed & Fodder

181. Gore, S.B. & Joshi, R.N. (Dep.Bot., Marathwada Univ., Aurangabad 431002): Effect of fertilizer and frequency of cutting on the extraction of protein from Sesbania. Indian J.Agron., 1976, 21(1), 39-42

Yields of dry matter and protein of Sesbania increased

significantly with NPK and with farmyard manure + superphosphate in the second.

182. Sandhu, H.S., Suri, K.P. & Brar, S.S. (Dep.Agron., Punjab Agric. Univ., Ludhiana): Effect of sowing dates, harvesting intervals and phosphorus levels on the yield and quality of cowpeas fodder. Indian J.Agron., 1976, 21(1), 11-16

The early sown crop of Cowpeas (Vigna sinensis var. cowpeas No. 10) (April 15) produced significantly higher green as well as dry fodder than the one sown late (May 15). Harvesting the crop 70 days after sowing proved to be the best both in respect of quantity as well as quality of fodder. The significant response to phosphorus was observed up to 25 Kg P_2O_5/ha during 1970. All the quality components showed improvement with phosphorus application.

Food & Spices

183. Spices. Trop.Prod.Quart., 1976, 17(2), 270-92

For India figures regarding production and exports of cardamom as also its export from 1971-72 to 1975-76 have been given.

Sugar

184. Dhanuka, O.P. Sugar industry in Bihar : Prospects of revival. Indian Sug., 1976, 26(9), 603-05

185. Gupta, M.R. & Gupta, S.C. (Sugar Res.Stn, Muzaffarnagar, U.P.): Brown leaf spot disease of sugarcane in North India. Indian Sug., 1976, 26(9), 621-22

Various aspects of the disease caused by Cercospora longipes Butler, to a number of recommended and high yielding varieties in western and central parts of U.P., are dealt with.

186. Singh, O.P. & Yadav, S.R. (Haryana Agric.Univ., Sugarcane Res.Stn, Yamuna Nagar, Haryana): Effect of pesticides on the wilt of sugarcane. Indian Sug., 1976, 26(9), 615-19

Combined incidence of wilt in association with stalk borer damage was significantly low under ekadrin, endrin and nuvacrow treatments.

FOREST-BASED INDUSTRIES

Paper, Board & Pulp

187. Misra, N.D., Murthy, V.R., Charyulu, S.S., Reddy, G.R. & Natarajan, K.R. (Sirpur Paper Mills Ltd., Sirpur - Kaghaznagar): Pulping properties of Eucalyptus hybrid of different age groups. Indian Pulp Pap., 1976, 31(2), 5-12

Best pulping properties of the Eucalyptus tree of 7 years, its alkali consumption, yield, bleach consumption and strength properties are discussed.

188. Industrial pulp and paper from indigenous materials. Econ.Trends, 1977, 6(2), 51

A number of National Laboratories of CSIR have developed processes for the production of industrial grade pulp and paper from Indian plants. Pulp from plant cellulose, the basic raw material for synthetic fibres, rayon and cellophane, is imported to nearly 50% of India's requirement.

189. Holford, B.A. Surveying the pulp and paper production capacity of the world. Unasylva, 1976, 28(III), 18-20

Reports a survey describing the method, objectives and limitations and interpretation of results of pulps & paper manufacturing capacity.

Others

190. Bakshi, B.K. (Director, Biological Res., For.Res.Inst. & Coll., Dehra Dun): Dealing with pests and diseases in tropical forests. Unasylva, 1976, 28(III), 21-24

Diseases and pests are the major biological determinants of forest productivity. Therefore development of trees with genetic resistance will be the most effective solution to deal with these problems.

191. Ghose, A.K. & Banerjee, R.K. (Indian Lac Res.Inst., Namkum, Ranchi): Advances in lac technology and utilization of by-products. Indian Fmg, 1976, 27(8), 25-27

Recent advances made in the processing of sticklac to seedlac and seedlac to shellac, and the utilization of by-products obtained during these processes have been described.

192. Manitripathi, S.K. & Khanna, B.B. (Indian Lac Res.Inst., Namkum, Ranchi): Industrial uses of lac. Indian Fmg, 1976, 27(8), 23-24, 27

Some important industrial applications of lac are in the field of spirit varnishes, nitrocellulose lacquers, wash primer, water-based finishes, pharmaceutical and confectionary coatings, mirror backing, hair lacquers, printing inks, drawing inks, electrical industry, gramophone records, grinding wheels, sealing wax, etc.

193. Maurya, R.C., Sen, P. & Gokulpure, R.S. (Indian Lac Res.Inst., Namkum, Ranchi): The technology of lac cultivation. Indian Fmg, 1976, 27(8), 29-30

Some of the pre-requisite operations common to the two strains of lac insect, viz. rangeeni and kusmi have been described. Also, the cultivation of rangeeni lac and kusmi lac has been given.

194. Saha, S.K. (Indian Lac Res.Inst., Namkum, Ranchi): Lac industry in India. Indian Fmg, 1976, 27(8), 5-6

Export of lac in 1974-75 was Rs. 24.33 crores. Internal consumption of lac is estimated to be between 2,000 - 3,000 tonnes annually which accounts for only 10-15 per cent of the total lac produced.

MINERAL-BASED INDUSTRIES

Coal

195. Samanta, A.K., Juneja, M.N. & Swaran Singh (Cent.Fuel Res.Inst., Dhanbad, Bihar): Coal gasification - recent developments. Chem.Age India, 1976, 27(10), 861-69

Some of the processes for coal gasification developed in the last decade in the United States are outlined in the article.

196. Siddheshwar Prasad -'King coal'and its future. Chem. Petro-chem. J., 1976, 7(11), 43-45

Statistics on sectorwise coal consumption and demand for 1975-76/1978-79 are given.

Iron & Steel

197. Synthetic iron oxide red and black. Chem.Petro-chem.J., 1976, 7(12), 36-37

Regional Research Laboratory, Bhubaneswar has developed a new process for the production of red and black iron oxides; the process involves the addition of milk of lime to ferrous-chloride solution, the resulting ferrous hydroxide is finally oxidized to the black oxide in the presence of air and catalyst.

198. Electrolytic iron powder. Econ.Trends, 1977, 6(3), 42

Regional Research Laboratory, Bhubaneswar has developed a process for the production of electrolytic iron powder utilizing waste from scrap/borings/turnings/iron ore/mill scale and waste from metallurgical and chemical industries.

Precious Stones

199. Virdi, M.S. (Nat.Physical Laboratory, New Delhi): Diamond technology. Indian east.Engr, 1976, 118(12), 575-77

An account of the occurrence, properties, synthetic production and applications of diamonds particularly from a technical angle and of research in India.

TEXTILE & CORDAGE INDUSTRIES

Man-made

200. Hagemann, R.F.A. (Fibres Technology, Du Pont De Nemours International S.A., Genega, Switzerland): Economic impact on developing countries of man-made fibres in comparison with natural fibres. Man-made Text.India, 1976, 19(12), 640-43

Resources for natural fibres are limited, therefore shortage for fibres can only be bridged by availability of man-made fibres. Allocating hydrocarbon feed-stocks for this industry is recommended.

WASTE PRODUCTS RECYCLING INDUSTRY

Agricultural

201. Reinforced organic manure. Econ.Trends, 1977, 6(2), 46

A reinforced organic manure process and processing plant has been developed by Shivaji College of Agriculture, Amravati utilizing plant residues collected while preparing fields.

202. Abdurahiman, C., Kunhammed Kutty, K. &Kumar, R.N. (West.India Plywood Ltd., Baliapatam, Cannanore, Kerala): Biofertilizers from agrowastes and wood wastes. Chem.Age India, 1976, 27(12), 1042-43

Studies have been conducted to find the suitability of certain agricultural residues as soil conditioners.

Industrial

203. Production of sulphuric acid and cement from phospho-gypsum using the OSW process, (Larsen & Toubro Ltd.). Chem.Age India, 1976, 27(12), 1009-14

Techno-economic details of the OSW (Chemie Linz A.G.) process for the production of sulphuric acid and cement from phospho-gypsum are discussed.

204. Aggarwal, A.N. (Gujarat State Fertilizers Co. Ltd., Baroda): Utilization of waste material from GSFC caprolactam complex. Chem. Age India, 1977, 28(1), 49-51

Various byproducts and methods of their recovery from the waste liquors of caprolactam plant are discussed.

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Refer. abstd. 1975, 20(2) 52-57 1-16

205. Bal, A.S. (Nat.Environ.Engng Res.Inst., Nagpur): Method for recovery of magnesium from sea water using sulphidic spent caustic waste. Chem.Age India, 1977, 28(1), 66-72

Probable method for the disposal of spent caustic waste from petroleum cracking industry by utilizing it to obtain magnesium hydroxide from sea water is discussed. Operational flow-sheet, experimental details and designs of different units are presented.

206. Chatterjee, A.C., Dutt, B.M. & Lad, A.P. (Walchandnagar Industries Ltd.): Potash fertilizer from distillery waste. Chem.Age India, 1976, 27(12), 1036-38

A process for the manufacture of potash fertilizer from wastes obtained from molasses - based distilleries has been evolved. Technoeconomical details of the process are described.

207. Chauhan, K.S., Padh, M.R. & Charandas, V. (Gujarat State Fertil. Co.Ltd., Baroda): Utilization of wastes from fertilizer group of plants at GSFC. Chem.Age India, 1976, 27(12), 1023-33

Facilities existing and proposed for waste utilization at GSFC are discussed in detail.

208. Chengappa, P.A. (Tech.Thinktank Co., Bangalore - 52): Reutilization of mercury from effluents of mercury cell chlor-alkali plants. Chem. Age India, 1977, 28(1), 41-43

Recovery of mercury from gaseous, liquid and solid wastes is discussed. The reutilization would effect a saving of 150 tonnes of mercury valued at one and a half crores of rupees annually, besides saving the environment from mercury pollution.

209. Ethirajulu, K. & Patel, R.P. (Dept.Petrochem.Technol.Polytechnic, M.S. Univ., Baroda): Utilization of waste methyl benzoate from IPCL. Chem.Age India, 1977, 28(1), 52-54

Utilization of methyl benzoate obtained as a waste from the DMT plants, is discussed, and a method for the production of sodium benzoate and benzoic acid from it with economic data is described.

210. Iyengar, M.S. (M.S.Iyengar & Associates (P) Ltd., New Delhi): Utilization of waste in pulp, paper, sugar, petroleum and agro-based industries. Chem.Age India, 1976, 27(12), 1045-51

Some of the wastes emanating from the paper, sugar, cement, petroleum and agro-based industries are reviewed and methods suggested for their effective utilization.

211. Mewea, A.K. & Sastry, D.V.N. (DCM Chemical Works, Delhi): Utilization of waste from alum manufacturing units. Chem.Age India, 1977, 28(1), 46-48

Feasibility of waste utilization processes from alum industry is discussed.

212. Nadkarni, S.K. & Mohanty, N. (Indian Aluminium Co.Ltd., Belgaum): Recovery of wastes in aluminium industry. Chem.Age India, 1977, 28(1), 37-38

Generation and disposal of wastes in the IAC's Belgaum plant are described.

213. Nayar, V.S.V. (Travancore Titanium Products Ltd., Trivandrum): Utilization of wastes from the sulphate-route titanium dioxide industry for the manufacture of sulphuric acid and synthetic rutile. Chem.Age India, 1977, 28(1), 33-36

Manufacture of titanium dioxide by 'Sulphate-route' and 'Chloride-route' is outlined. The latter route is becoming more popular on account of lesser number of operations involved, availability of chlorine, and the waste disposal problems experienced in the conventional system, minimized in the chloride route.

214. Panigrahi, D. & Pisharoti, P.S. (FACT, Udyogmandal): Case study on utilization of wastes from fertilizer industry - with reference to FACT Ltd., Chem.Age India, 1976, 27(12), 1015-22

Processes developed and adopted by FACT for judicious utilization of the byproducts obtained from its fertilizer plants are discussed.

215. Paul, B.B. (B.B. Consulting 'N' Engineering Pvt Ltd., Bombay): Poultry feed and mixed fertilizers from distillery waste. Chem.Age India, 1976, 27(12), 1039-41

Distillery effluent can be used as the cheapest raw material for the manufacture of poultry feed and also for mixed fertilizer. The process, equipment and flow sheet given.

216. Sadane dan Pillai, K. (FACT, C chin Div.): Util zation of wastes from fertilizer industries af FACT. Chem.Age India, 1976, 27(12), 1034-35

The chemicals obtained from the fertilizer industry waste and the range or more new products which can be derived from the effluents are presented.

217. Sen, D.K., Das, B.P. & Nair, C.S.B. (Cent.Fuel Res.Inst., Dhanbad): Recovery and utilization of chemicals from by-product wastes of the coking industry. Chem.Age India, 1977, 28(1), 55-65

Utilization of coking industry wastes, some of which could be converted into useful chemicals is discussed. The work done at CFRI is highlighted.

218. Sriram, N., Krishnan, M. & Thampy, R.T. (Sri Ram Inst.Industr.Res., New Delhi): Organic waste as source for energy. Chem.Age India, 1976, 27(12), 1052-54

Processes for the conversion of municipal wastes into fuel are reviewed.

219. Viswanathan, P.V., Sankaran, C. & Khangaonkar, P.R.(NML Unit, CSIR Complex, Madras): Problems of lime and chrome sludges in chemical industries. Chem.Age India, 1977, 28(1), 73-75

Waste treatment problems presented by some chemical industries such as pulp, paper, chromium etc. are discussed and work done on the utilization of these is presented.

220. Walavalkar, B.R. & Wahal, S.N. (Saurashtra Chemicals, Porbandar, Gujarat): Utilization of wastes from soda ash industry. Chem.Age India, 1977, 28(1), 44-45

Processes for the recovery of soda ash industry wastes (Distillery waste, wastes from slakers and brine purification, liquid carbon dioxide, etc.) are discussed.

NOTES & NEWS

Crude from Bombay High

The first consignment of crude from Bombay High has been pumped into the pipelines of M/S Bharat Refineries : the present capacity of the two wells being ten thousand barrels per day. (Chem.Petro-chem.J., 1976, 7(9), 25).

Trial Run of Borax Unit in Ladakh Soon

Commercial production of borax (which is hitherto imported) is to be started at Puga Valley, Ladakh, on an experimental basis. (Indian Ceram., 1976, 19(4), 512).

Hind Teleprinters to Produce Electronic Items

Hindustan Teleprinters will produce in the next two years electronic teleprinters. Investment on the new project would be as much as Rs. 75 lakhs currently about 60 per cent of the capital of the Corporation and about 25 per cent of over-all funds being invested in various expansion and development programmes in the current plant period. (Business Standard, p. 3, 21/2/77).

Neyveli Lignite Corporation of Red

A significant increase in production has helped the Neyveli Lignite Corporation to get out of the red. The Corporation is likely to earn a gross profit of Rs. 6.75 crores this year against a loss of Rs. 4.23 crores last year. (Financ.Express, p. 8, 20/2/77).

IOC Turnover Touches Rs. 2,400 Crores

The Indian Oil Corporation's marketing division had a turnover of Rs. 2,400 crores in 1976-77, the highest for any public sector undertaking in the country. (Financ.Express, p. 3, 19/2/77).

First-Coal Mine in UP Starts Production

The first coal-mine in Uttar Pradesh has started production. Since February 15 the mine is raising over 2,000 tonnes of coal daily. (Business Standard, p. 4, 22/2/77).

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